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## THE DRESSING OF MINERALS.

*The Dressing of Minerals.* By Prof. Henry Louis.  
Pp. x+544. (London: Edward Arnold, 1909.)  
Price 30s. net.

THE author says, in his preface:—

"The object of the present work is to give an account of the theory and practice of the dressing of minerals, which will, I hope, prove useful to the miner or metallurgist who desires to understand the principles upon which this art is based, as also to the manufacturer who supplies the necessary appliances, and above all to the student who is preparing for either of the above professions." . . . "I have disregarded the time-honoured division which would make separate branches of the dressing of ores, and the cleaning of coals."

The first impression produced on reading this statement is that the new departure is warranted; that there are many points in common in the two branches, and that the comparison of practice under the different conditions would be of an illuminating character. The further perusal of the book, however, seems hardly to bear out this promise, and the joint treatment of the two branches rather tends to confusion, for the cleaning of coal involves the use of so many methods that are inapplicable to ores and *vice versa* that, if the two branches are to be treated in the same book, they should at least be dealt with under different sections.

Difficulties, inherent to the method adopted of dealing with the subject, are found throughout the book, and it is practically only in the chapter on general construction of dressing works that any clear differentiation between coal and ore dressing appears. It may be that the manufacturer should be acquainted with the machines used in both classes of work, and even that the student should acquire a knowledge of, and be able to draw comparisons between them, but that coal-miners should be called upon to study the various forms of rock-breakers, stamps, and other crushing mills and fine grinders seems unnecessary.

The book is well written and interesting, more especially, perhaps, in those parts that deal with theoretical considerations which relate to the construction of the machines. The designs of various machines are illustrated by excellent plates, and leading dimensions are often given, as well as the cost of the machines and manufacturers' figures regarding capacity. The latter are sometimes apt to be high; for instance, it is stated on p. 140 that a pair of Krom rolls 26 inches diameter by 15 inches face will crush about two tons of average ore per hour to about 30 mesh.

Relatively little information, however, is given as to setting up machines, their adjustments or running, the general conditions that have to be fulfilled or the general care of a dressing plant. Early forms of machines and historical references have received a good deal of attention, possibly more than they deserve, while in many cases modern forms have been

passed over with brief mention, and a statement that they have not been long enough in use to enable an opinion to be formed regarding their value.

The treatment of the subject is divided into general considerations; volumetric sizing; sorting and washing; comminution; separation by specific gravity; appliances depending essentially on vertical fall; jigs; horizontal current separators; shaking tables; pneumatic, magnetic, and electrostatic separation; separation by surface tension; accessory appliances and general construction of dressing works.

It is, perhaps, in the chapter on volumetric sizing that the treatment of coal and ores together is most objectionable. It is sometimes difficult to gather whether the machine spoken of is used for coal or ores, and although, of course, many of them could be used for both, there is a more or less clear line of distinction between the two. To find a Wilfley impact screen described between the Klein screen and Zimmer conveyor screen seems curious. Trommels are said to be satisfactory to  $\frac{1}{8}$ -inch mesh. In the chapter on comminution such varying machines as rock breakers, rolls, Huntingdon mills, ball mills, tube mills, and disintegrators have been dealt with all too shortly. The Griffin mill is passed over in one paragraph, in which it is described as "like the Huntingdon mill with a single large roller which is caused to revolve on its spindle by means of gearing," but the construction, mode of action, and causes of crushing are so different in the two machines that the Griffin certainly merits a fuller description.

It seems questionable whether vanners should be included under the title of shaking tables, and no distinction is made between the condition of a pulp adapted for a vanner and that for a shaking table. The number of discussions that have taken place, and tests that have been made to prove whether it is better to classify the pulp or not before treatment on vanners, do not appear to be mentioned, while an authoritative pronouncement on the subject would have been of interest.

The subject of pneumatic separation has been treated more fully than it appears to deserve, and machines described which have certainly not warranted their existence. Magnetic separation has also received a good deal of attention, and many machines are figured which are used both for strongly and feebly magnetic substances.

In dealing with separation by surface tension, the author says it is impossible to offer correct or satisfactory explanations of the observed phenomena. He, however, presents an historical account of the development of the processes which depend upon this property, and briefly refers to several of the flotation processes. He has, however, only described the Elmore oil process and the Elmore vacuum process in any detail, from which it would seem that, in his opinion, they only are worthy of consideration. The chapter on accessory appliances passes from tipplers to various ore bin gates, then comes back to creepers, and returns to various conveyors of the belt, bucket, scraper, and screw types. Car and bucket elevators and tailings-wheels are dealt with, as well as ore

feeders, and the chapter is finished with a few words on weighing and sampling.

There is a great deal of varied information contained in the book, but it would have been better to confine the subject to one or other of the branches referred to in the opening paragraph.

#### DUSTLESS ROADS.

*Dustless Roads. Tar Macadam: A Practical Treatise for Engineers, Surveyors, and Others.* By T. Walker Smith. Pp. xi+225. (London: Charles Griffin and Co., Ltd., 1909.) Price 10s. 6d. net.

THE growing use of motor-cars, and the destructive action due to the rapid speed at which they are driven, and the sucking action of the indiarubber tyres on the surface of the roads, has rendered a change in their management necessary.

It is the almost unanimous opinion of road experts that, in order to preserve the surface of the roads in good condition, it is necessary that some kind of bituminous material must be used for binding the stones of the macadamising, which, while cementing them together, will also give a waterproof and comparatively dustless surface.

The book under notice has, therefore, been published at an opportune time, as the method of repairing roads described in it, which has been more or less successful, has been so far only of a tentative character, the work not being carried out on any scientific basis, but very much by the rule of thumb.

The author, who was borough engineer at Barrow-in-Furness for several years, had under his charge many miles of macadamised roads subject to motor traffic, and devoted his attention to experimenting and trying to find out the best means of solving the difficult problem of keeping these roads in good order, and preventing the creation and spreading of dust, at a reasonable outlay. The results of his experience are given in the book under notice. The author, however, not content with his own experience, has also collected the opinions of a large number of road surveyors throughout the country as to the advantages and disadvantages, and cost of tar macadam, the answers to the queries submitted being given in the tables contained in the book.

The subjects dealt with are divided into fifteen chapters relating to tar macadam as a remedy for dust nuisance; the necessity for standardisation in construction; tar; aggregates for tar macadam; preparation and laying; mechanical mixing; effect of wear and tear; scavenging, watering, and maintenance; camber, gradient, noiselessness, and hygienic advantages; tractive effort; statistics of road mileage; cost of maintenance; and tar spraying. There are twenty-four illustrations and a tabulated analysis of the replies to queries.

The author shows that the binding material used in the making or repair of macadamised roads is the crux of efficient road maintenance and the prevention of dust. His opinion is that it is absolutely necessary, if macadamised roads are to meet the needs of present-

day traffic with the searching demands that motor traffic makes on the surface of the road, that a bituminous binding or matrix should be employed. He points out that so far, although this fact is fully recognised, no scientific study has been made to standardise the materials used, and the proportion and quality of this material:—

“Thus the matrix is usually prepared as it seems best to the individual in charge of the tar boiler who uses anything that comes from the local gas works; who boils it as long as he thinks necessary, and adds to it whatever he thinks may improve it in the way of pitch or creosote. It is a subject in which the personal factor has entered to an exceedingly great extent, and each man acts more or less as it seems best to him in his own mind.”

The aggregates for tar macadam are also fully dealt with. The author points out that as the tar binding cements the stones together, the abrasion caused by friction in water-bound macadam is thus absent, the properties of noiselessness, elasticity, and resilience being secured. The only portion of the road material which is subject to any considerable wear is the surface, which has to bear the friction due to the rolling of the wheels, and also the impact of the horses' feet. It is, therefore, contended that the use of granite or other similar expensive material is not necessary for the lower coat, which consists of from 80 to 85 per cent. of the whole; but that where the road is only subject to moderate traffic the lower layer may consist of hard limestone or slag, either of which material holds the tar better than granite; the upper layer, which has to bear the surface wear and tear, being composed of granite. The author's experience leads him to the conclusion—

“that it is an absolute waste of money to put such good material as granite in the bottom when a less costly material will do perfectly well when armoured with a good coating of tarred granite.”

The patent processes known as “Tarmac” is described. The makers of this road material have expended upwards of 20,000*l.* in the construction of works and plants at Wolverhampton. The aggregate used is slag, the tar is distilled before using, and the mixing is done by machinery. The author, however, does not seem to think that it has any special advantage over ordinary tar macadam mixed locally when this is done in a proper manner. In the tables the cost of the materials and of mixing and laying is given for a great number of localities. As an average this may be taken as from two shillings to half a crown per square yard for a coating of 3½ inches of slag and hard limestone for the bottom layer, and half an inch of tarred granite for the surface coat. The general opinion appears to be that there is a saving in the cost of maintenance of roads where tar macadam is used in place of water-bound macadam, in some cases amounting to as much as 75 per cent., the average, however, being put at 37½ per cent.

With occasional tarring and sanding of the surface, a tar-macadam road, so far as the lower layer is concerned, is practically everlasting. The surface